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ABSTRACT

Compositions of 1000 words were collected from 32 eighth-graders and 32 twelfth-graders in Manitowac, Wisconsin. In each grade, 16 males and 16 females were equally distributed into two ability groups based on IQ. Data from the writing samples were analyzed with an analysis of variance in which the factors were grade, sex, and ability level. The data consisted of five ratios computed from a frequency count of sentences, T-units, clauses, and words, together with frequency count of 11 kinds of subordinate structures. Results showed significant differences between the two grade levels, but not between sexes or ability levels. Grade differences included the use by 12th graders of longer clauses and T-units; more coordination between main clauses by 8th graders, resulting in a higher ratio of T-units per sentence; more frequent use of noun clauses by 12th graders; and more frequent use of adverb clauses by 8th graders. (Author/MF)

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A COMPARISON OF THE WRITING OF EIGHTH- AND TWELFTH-GRADE STUDENTS

Nathan S. Blount, Shelby L. Johnson, Wayne C. Fredrick

Report from the Individually Guided Instruction
in English Language, Composition, and Literature Project
Nathan S. Blount and Lester S. Golub, Principal Investigators

Wisconsin Research and Development
Center for Cognitive Learning
The University of Wisconsin
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This Technical Report is from Individually Guided Instruction in English Language, Composition, and Literature Project in Program 2. General objectives of the Program are to establish rationale and strategy for developing instructional systems, to identify sequences of concepts and cognitive skills, to develop assessment procedures for those concepts and skills, to identify or develop instructional materials associated with the concepts and cognitive skills, and to generate new knowledge about instructional procedures. Contributing to these Program objectives, the long-range objective of the English Project is to install and test materials for individually guided instruction in language, composition, and literature. Prerequisite activities include formulating behavioral objectives for students and teachers, based on a content and concepts outline, and developing measurement instruments related to the behavioral objectives.

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ABSTRACT

Compositions of 1000 words were collected from 32 eighth graders and 32 twelfth graders in Manitowoc, Wisconsin. In each grade 16 males and 16 females were equally distributed into two ability groups on the basis of standardized IQ test scores.

Data from the writing samples were analyzed with a 2 x 2 x 2 analysis of variance in which the factors were grade, sex, and ability level. The data from each student consisted of: five ratios computed from a frequency count of sentences, T-units, clauses, and words; and frequency counts of 11 kinds of subordinate structures.

Results showed that twelfth graders wrote longer clauses and T-units than did the eighth graders. Eighth graders used more coordination between main clauses, resulting in a higher ratio of T-units per sentence for eighth grade than for twelfth grade. Students in both grades employed approximately the same number of subordinate clauses and wrote sentences nearly equal in length. Noun clauses were employed more frequently by twelfth graders than by eighth graders, while adverb clauses were used more often by eighth graders. Adjective clauses were used equally often at both grade levels. Other subordinate constructions occurred too infrequently for statistical comparison. Differences between boys and girls and between high and average levels were not significant on any measure.

I
INTRODUCTION

This paper reports the results of an analysis of 1000-word compositions written by eighth- and twelfth-grade students. The measures used in analysis of the writing samples were: (1) the five synopsis factors proposed by Kellogg W. Hunt (1965, n.d.)—sentence length, T-unit length, clause length, the subordinate clause index, and the main clause coordination index; and (2) tabulations of the frequency and kinds of subordinate clauses. Data on these measures were analyzed to determine possible differences between grade levels, between boys and girls, and between two ability groups.

For several decades at the beginning of this century, researchers interested in the growth of oral and written language tested several different measures of language development. Tabulations of vocabulary and classifications of words into parts of speech were used (Stern, 1924; Smith, 1926; Shirley, 1933). Stormzand and O'Shea (1924), McCarthy (1930), and Bear (1939) considered various sentence types—simple, compound, complex, elaborated. Sentence length and average number of words per response were studied (McCarthy, 1930; Fisher, 1934; Davis, 1937; Bear, 1939). LaBrant (1933) investigated clause length and frequency and type of subordination as possible indicators of language development in written composition. Using the subordination index created by LaBrant, Watts (1944) compared LaBrant's conclusions with his own results of an analysis of the written sentences of English school children.

These and other earlier studies in language development have been adequately reviewed by Strickland (1947), McCarthy (1954), Carroll (1960), and Ervin and Miller (1963).

In the last decade researchers have attempted to find more adequate and reliable measures of language than those of the past. Modern approaches to knowledge and new developments in linguistics and grammar by such scholars as Fries (1940, 1952) and Chomsky (1957) have contributed a great deal to recent techniques of language analysis. Drawing from structural linguistics, Strickland (1962) identified the phonological unit to analyze the oral language of elementary children. Besides calculating the average length of the phonological unit, Strickland observed the patterns of syntactic units and the kinds of subordinate structures found within them. She concluded that length of the phonological unit was an unsatisfactory measure of language maturity. Other studies have used systems of analysis similar to Strickland's (Riling, 1965).

In a report of the first seven years of a thirteen-year longitudinal study (K-12), Loban (1963) employed the communication unit and the phonological unit to analyze oral language. Deriving a definition from Watts' (1944) description of a linguistic unit, Loban described the communication unit as "a group of words which cannot be further divided without the loss of their essential meaning [Loban, 1963, p. 6]." Results of the study showed that, as the children grew older, they increased the number and length of their communication units. Brighter students used more communication units and more subordination within the units.

Menyuk (1963a, 1963b) applied Chomsky's three-part analysis of sentence structures—phrasal, morphological, and transformational—to the oral language of nursery school children and first graders. She found that all structures used in the language samples could be accommodated and described by the Chomsky model; some structures, however, were restricted to a children's grammar only. Since all of the basic structures used by adults also appeared at the nursery school level, Menyuk concluded that the Chomsky system, with emphasis on the transformational analysis, did measure growth.

Since Strickland, Loban, and Menyuk were concerned primarily with the oral language of preschool or elementary school children, detailed reviews of their studies will not be given

here. Instead, emphasis will be placed on the methods and results of researchers who have investigated characteristics of the writing of older students.

Hunt (1964, 1965, n.d.) conducted a series of studies of the syntactic structures found in the written composition of students at various grade levels, of students in two ability groups, and of skilled adults. In his first study Hunt (1964) obtained 1000 words of writing from students (1964) in Grades 4, 8, and 12. The 18 students at each grade (9 males, 9 females) were of average ability, scoring 90-110 on the Short Form of the California Test of Mental Maturity (CTMM). The topics for the writing samples, collected over a trimester period, were selected by the teachers. In an effort to find a reliable means of measuring syntactic growth, Hunt compared sentence length, clause length, subordination ratio (ratio of subordinate clauses to total clauses), and a new measure, T-unit length. Hunt defined a T-unit as a main clause plus any subordinate clauses attached to it. Results showed that sentence length increased with maturity but that as a measure of individual growth, it was unsatisfactory; the longest sentence in the 54,000 word corpus was produced by an eighth grader; and a fourth grader averaged longer sentences than any twelfth grader. Clause length significantly distinguished fourth graders from eighth but not eighth graders from twelfth. The subordination ratio showed significant differences between grades, but again, as with the other two measures, some scores from individuals in lower grades exceeded those in higher grades. T-unit length discriminated between grade levels most adequately and was considered by Hunt the most valid index of syntactic maturity. From a calculation of contingency coefficients, the relative validity of these four measures was established. In order of decreasing validity they were: T-unit length, clause length, subordination ratio, and sentence length.

To discover what specific elements were responsible for the increase in T-unit length from Grade 4 to Grade 12, Hunt (1964) tabulated kinds of subordinate clauses, nominals, modifiers, verb phrases, adverbials, and other structures. He found that total number of noun clauses did not increase systematically. The frequency of adjective and adverb clauses increased with maturity, but only the increase for adjective clause was statistically significant, with the number doubling from Grade 4 to Grade 12. Twelfth graders, in general, produced more total subordinate clauses than the other groups.

In a subsequent report, partially a rewrite of the 1964 study, Hunt (1965) introduced two other useful indexes of maturity to accompany sentence length, clause length, and T-unit length. They were the subordinate clause index and the main clause coordination index. The subordinate clause index (ratio of total clauses to main clauses) provided direct information on the number of times a writer attached a subordinate clause to a main clause. The main clause coordination index (ratio of T-units to sentences) reflected the frequency of coordination of main clauses within a sentence. Hunt explained in detail the mathematical relationships among these five measures, which he called the five synopsis factors.

From comparisons of all five synopsis factors, Hunt concluded that T-unit length was the best indicator of syntactic differences from Grades 4 through 12. The other measures, in order of decreasing adequacy, were: clause length, subordinate clause index, and sentence length. The main clause coordination index was not significant. All factors increased significantly with maturity except the main clause coordination index, which decreased.

A comparison of the writing of twelfth graders with that of skilled adults published in Harper's and Atlantic indicated that clause length showed the greatest increase and became at this level as good an index as T-unit length. The increases in T-unit length were attributable mainly to a 36 percent increase in clause length.

Hunt (n.d.) added the writing of superior ability fourth- and twelfth-grade students to his previous analyses to determine which synopsis factors discriminated best between ability groups. Superior students were those who had scored 130 or above on the CTMM. The total corpus of writing was 54,000 words from 54 writers, 18 at each age level—fourth grade, twelfth grade, and adult. Comparing the writing of average and superior fourth graders, Hunt found that T-unit length and the subordinate clause index showed significant differences between ability groups at this level; clause length was not significant. Also, superior fourth graders wrote shorter sentences than average fourth graders. In twelfth grade, T-unit length again discriminated between average and superior ability students, but even more significant at this level was clause length. Superior students wrote about 12 percent more words per T-unit and 21 percent more words per clause than average twelfth graders. There was no difference between the twelfth-grade ability groups on the main clause coordination index, but the subordination index showed that superior students wrote fewer subordinate clauses than their average classmates. Skilled adults wrote longer T-units, clauses, and sentences than either

twelfth-grade group. Adults also incorporated more subordinate classes than did twelfth graders. At twelfth grade and beyond, clause length became the most significant measure of sentence maturity, though T-unit length was best at lower levels.

In a study reported after the present project had begun, O'Donnell, Griffin, and Norris (1967) analyzed T-units in speech and writing in an investigation of development in control of syntax of 180 children, Grades K, 1, 2, 3, 5, and 7. The language samples analyzed were oral and written responses to two silent eight-minute films. The children, in groups of three, were asked to tell the story orally, to answer specific questions, and in Grades 3, 5, and 7, to write the story and the answers to the same questions. Following Hunt's (1964, 1965) procedures, the investigators deleted unconnected fragments from the typed transcripts, counted total words, and segmented the samples into T-units. Each T-unit was then analyzed separately as to length, pattern, rhetorical type, and number and kinds of sentence-combining transformations contained within. The researchers found that children at all grade levels increased in both speech and writing the length of response, the length of T-units, and the number of sentence-combining transformations included within T-units. Investigation of rhetorical types of sentences proved fruitless. Especially noteworthy was the increase in (1) nominal and adverbial transformational constructions and in (2) frequency of coordination in nominals and predicates.

In a later chapter more detailed comparisons will be made of the results of the present study with those of Hunt (1964, 1965, n.d.) and of O'Donnell, Griffin, and Norris (1967). The present study followed as closely as possible the analytic procedures of these recent studies to permit such comparisons.

II
PROCEDURES

One-thousand-word writing samples were collected from eighth graders and twelfth graders of high and average ability. For comparison with the Hunt studies, the syntactic structures analyzed were the same as those reported by Hunt (n.d.) with the exception of the complexity of nominals, which this study omitted. Tabulations were made of the number of sentences, T-units, clauses, and words written by each student. From these frequency counts, five scores were computed: average words per sentence, average words per T-unit, and average words per clause; average number of clauses per T-unit, and average number of T-units per sentence. The frequency of the various kinds of subordinate clauses was also studied. Possible differences between eighth graders' and twelfth graders' scores on these measures were subjected to analysis of variance.

SUBJECTS

The investigators used a randomly stratified sample for this study. A total of 64 students participated, 32 eighth graders and 32 twelfth graders. In each grade there were 16 males and 16 females equally distributed into two ability groups. In the eighth grade the high ability group consisted of students whose scores on the Kuhlmann-Anderson Test (KAT) were 120 or above; the average group scored 90–110 on the same test. In the twelfth grade the students in the high group scored 117 or above on the Henmon-Nelson Test of Mental Ability (HNT); scores on the HNT for the average group ranged from 90–110. Table 1 shows the mean IQ score for each group; there were eight students in each cell.

The eighth graders were from two junior high schools in Manitowoc, Wisconsin, a city of approximately 35,000 population. Seventeen eighth-grade students were from one school, 15 from the other. The twelfth graders attended high school in the same city.

STATISTICAL DESIGN

The factors in the 2 x 2 x 2 factorial design for analysis of variance were grade, sex, and ability level. There were eight students in each cell (total N = 64). The data tested by analysis of variance were: five ratios computed from frequency counts of number of sentences, T-units, clauses, and words for each student; and the frequency counts of 11 kinds of subordinate clauses and structures.

Table 1

Mean IQ Score for Grade x Ability x Sex Groups

(N = 8 per cell)

	Grade 8 (KAT)		Grade 12 (HNT)	
Sex	High	Average	High	Average
Male	129	102	128	107
Female	126	100	129	100

COLLECTION OF DATA

A writing sample of 1000 words, or within 1% of 1000 words, was collected from each student during the school year 1966-1967. All writing was done in English class as part of the regular class assignment. The eighth graders required about five weeks to accumulate 1000 words. Because of administrative problems, twelfth-grade themes were collected over a period of four months. Students were not aware of their role in this study, and teachers were not told which students' writings would be analyzed.

SPECIFICATIONS FOR WRITING SAMPLES

Both teachers and students determined the topics for the student themes. Teachers were urged to avoid topics which would prompt a great deal of direct discourse since sentences of this type would be eliminated before the word count. In some cases the students were given a list of possible narrative and expository topics and were allowed to choose those which appealed most to them.

III
WRITING SAMPLES

Themes accumulating to approximately 1000 words were written by each eighth- and twelfth-grade student. These writing samples were collected over a period of five weeks for eighth graders and four months for twelfth graders. The writing of 64 students was scored for number of sentences, T-units, clauses, and words and for kinds of subordinate clauses. These scores were then submitted to analysis of variance to test possible differences between the syntactic structures written by both sexes at two grade levels and at two ability levels.

EXCLUSION OF CERTAIN KINDS OF SENTENCES

Kellogg Hunt (n.d.) in his report on the sentence structures of superior fourth- and twelfth-grade students and superior adults made certain procedural recommendations as to what to omit in sentence analysis. Relying on these recommendations, the present investigators omitted the following items from the writing samples before totaling the 1000 words:

1. Sentence fragments and unintelligible structures
2. All direct discourse. If direct discourse is included, the immature writer is credited with an abundance of noun clauses, and his overall clause length is decreased by the presence of many abnormally short clauses, such as "Mary said [Hunt, n.d., p. 28]."
3. Imperatives and questions. These occur too infrequently in writing to influence the statistical analyses significantly [Hunt, n.d., p. 29–30].

The remaining sentences then are easily described: they are declarative sentences not containing direct discourse.

WORKING DEFINITIONS

The investigators used Hunt's definitions of sentence, clause, and T-unit in deciding what structures would be tabulated as such. A sentence was defined as "the words written between a capital letter and a period or other terminal punctuation." A clause was "a structure containing a subject (or coordinated subjects) and a finite verb phrase (or coordinated verbs or phrases)." T-unit, or "minimal terminable unit," was defined as "one main clause plus the subordinate clauses attached to or embedded within it [Hunt, 1965, p. 49]." A T-unit is the shortest grammatically allowable unit into which a sentence can be segmented without producing sentence fragments. T-units within a sentence are usually signaled by the common coordinators and, but, or and so. Every sentence contains at least one T-unit but may have more. The number of T-units within sentences may vary considerably. A very young writer, not yet adept at punctuation, may write an extremely long passage, beginning with a capital letter and ending with a period. He would have only one sentence but many T-units.

This passage written by an eighth grader illustrates the differences among clauses, T-units, and sentences:

If I had a million dollars, I think that I would do a lot of things, but I would put most of the money in the bank and I would start on another job so people couldn't call me a lazy man.

Here is the same sentence segmented into T-units:

adv N
If I had a million dollars/I think/that I would do a lot of things//
but I would put most of the money in the bank//
adv
and I would start on another job/so people couldn't call me a lazy man//

This one sentence contains three T-units (marked by double slashes), each of which could stand alone as a grammatically complete structure. In addition to the main clauses, two of the T-units have one or more subordinate

clauses (marked by a single slash and an abbreviation). Every T-unit has at least a main clause and may have several subordinate clauses. A description of the various kinds of subordinate clauses will be given later.

A definition of word was also needed to avoid large discrepancies in the actual word count of the writing samples. Decisions on whether to count a structure as one word or two (no matter how the student had written it) were made by referring to Webster's Seventh New Collegiate Dictionary, 1965. In a personal interview the investigators were advised by Hunt (Madison, Wisconsin, June, 1966) to consider all contractions as two words since they would be written out in formal writing. Also, all proper nouns, regardless of their "actual" word count, were tabulated as one word. Consequently, terms like Mr. Grimm, Joe, and Yellowstone National Park were counted as one word.

MARKING OFF T-UNITS AND CLAUSES

To facilitate the analysis of T-units and clauses, the 1000-word samples were typed exactly as the student had written them. Typists were instructed not to correct misspellings and punctuation, not to add words which were carelessly omitted, and not to delete words which the writer himself had not deleted. The first process of breaking each writing sample into sentences was accomplished simultaneously with the typing. The typists were told to number each sentence consecutively and to consider as a sentence everything that appeared between a capital letter and terminal punctuation. Working with copies of the typed material, two raters indicated the end of each T-unit with a double slash (//).

T-units within sentences are usually coordinated with and, but, or or so. The coordinator must be followed by a clause having a subject and finite verb. This use of a coordinator between T-units should not be confused with a within-clause coordinator.

> My father and I went hunting,// and we got a four-point buck.//

The first and in this sentence acts as a coordinator for two noun phrases; the second, as a coordinator between T-units. The first does not signal a T-unit because the fragment, My father, would remain.

The word so required special attention because it has two very different functions. Used one way the word means (and) so; used another, so (that). (And) so begins a T-unit; but so (that) signals a subordinate adverb clause, as in the

adv

T-unit ". . .and I would start on another job/so people couldn't call me a lazy man.//" Here the writer clearly means so that. At other times, when the ambiguous so could understandably be either possibility, the decision of marking off the following structure as a T-unit or as an adverb clause was arbitrary.

Subordinate clauses were indicated by a single slash, and the type of clause was written immediately above. The subordinate clauses found in the writing samples were identified as the following kinds:

noun
adjective
adverb
comparison
deferred subject
cleft sentence
subjunctive word order
complement to an adjective
following a Vs
"the more, the merrier"
special which

TYPES OF SUBORDINATE CLAUSES

Clauses were classified, using Hunt's methods. However, the category of clauses following a Vs was added to those found by Hunt. This kind of clause and certain structures in the familiar categories are explained in the following section.

Noun Clauses

Most noun clauses occurred in the familiar nominal positions of subject, direct object, and object of a preposition. Another fairly common position was as an appositive after a noun. Here are several examples of the appositive noun clause:

It creates a feeling that we shall strive on.
The fact that there are good teenagers is never mentioned.
He stated the opinion that we should continue to fight.

Although on the surface these noun clauses seem identical to adjective clauses in the same position, their deep structure, or derivation, is quite different. If these were adjective clauses, one could rebuild the sentences from which they were derived, using the nouns they follow.

For example,

It creates a feeling that we fear.

↓

We fear a feeling.

This process cannot be used on noun clauses in apposition without loss of meaning:

It creates a feeling that we shall strive on.

We shall strive on a feeling.

or:

He stated the opinion that we should continue to fight.

We should continue to fight the opinion.

An easy test for an appositive noun clause is to place it in predicate nominal position after be:

A feeling is that we shall strive on.
The fact is that there are good teenagers.
The opinion is that we should continue to fight.

Adjective clauses will not function in the predicate nominal position; appositive noun clauses will.

The relatively infrequent "asides" such as I suppose and I think could cause some concern if they occurred more often. If they appeared initially in the sentence, as in "I thought the party was disastrous," the following clause was identified as a subordinate noun clause. Questions arose, however, when I thought appeared medially or finally.

The party, I thought, was disastrous.
The party was disastrous, I thought.

Since there is not yet a totally satisfactory way of distinguishing the main and subordinate clauses in these cases, clauses such as I thought were considered the main clause regardless of their sentence position.

Where and *When* Clauses

Although clauses beginning with where and when presented no special problems, one should realize that they may function as any of three frequently used clauses—adjective, adverb, or noun—depending upon their sentence position and movability. As adverb clauses they were least difficult to identify because they could be moved to different positions in the sentence without loss of meaning.

When I woke up, I heard noises outside the tent.
I heard noises outside the tent when I woke up.

A when or where clause functioning as a nominal was most likely to occur as the direct object after verbs like remember, imagine, and so on.

The sheriff remembered where he lost his keys.
I can imagine when they'll arrive.

Clauses in this position were analyzed as noun clauses. However, if the writer supplied the deletable noun of place or time before where or when, the clause then became an adjective clause, as in:

The sheriff remembered the place where he lost his keys.

As an adjective clause, where he lost his keys cannot be moved away from the NP it expands without destroying the deep structure relationship in the sentence:

Where he lost his keys, the sheriff remembered the place.

An example of the where or when clause used as an adjective can be seen in a sentence such as "The fire occurred that time when they were gone." That time when they were gone is used as an adverbial of time, but the entire structure can be further analyzed as an NP + a clause. The clause itself functions as an adjective clause even though it does appear within a larger adverbial structure.

Clauses of Comparison

This type of clause was tabulated separately rather than with the movable adverb clauses. Although some clauses of comparison were movable, as in "I left as soon as I could," most were very closely connected to a noun, adjective, or adverb and had a fixed sentence position. Here are several examples:

It got so dark that I was going to turn on my lantern.
You do a lot more than you did at the first of the year.
The clouds seemed so low that you could catch one.
They are so crowded that you can't walk up and down the steps.
We should have more dances than we had last year.
The bell made such a noise that I couldn't hear.

There were two kinds of clauses whose classification as an adverb clause or as a clause of comparison depended on the context of the sentence. These special cases were clauses beginning with as far as and as long as. When the writer intended the literal meaning of far and long, expressions of distance,

length, or duration, the clauses were tabulated as clauses of comparison. But when the function of the structures was analogous to insofar as or if, they were considered adverb clauses.

As far as the Indians could see, buffalo crowded the prairie. (comparison)

As far as the jury is concerned, the prisoner is guilty. (adverb)

The dangling climber hung on as long as he could. (comparison)

She said I could go as long as I told her where. (adverb)

Clauses Complementing an Adjective or Following a Verb Like *Seem* (Vs)

Some subordinate clauses appeared as a complement to an adjective, usually a predicate adjective. These clauses could not be moved away from their position after the adjective.

I'm sorry (that) I didn't do better.
She was sure (that) I had left home.
The deputy was convinced (that) the car was stolen.

A very infrequent kind of complement clause occurred after a Vs, a verb like seem, feel, appear, look, and so on. Here are some examples of this kind of clause.

The paragraph sounds like the author is against war.
She looked as if she had seen a ghost.
The director felt as though the tempo was too slow.

Usually after a Vs one finds a noun, an adjective, or a noun clause as in "He seems a bore," "She looked charming," or "They felt that the meeting was a mistake." The investigators hesitated, however, to call clauses beginning with as if, like, and as though adjective clauses because they cannot be derived in the same way as adjective clauses. In construction they seemed more like adverb clauses, yet they were definitely nonmovable, and they were a necessary structure in the sentence.

Deferred Subject and Cleft Sentences

Occasionally a writer used the indefinite it, which had no referent, as the "grammatical" subject of the sentence. The "logical" subject followed later, sometimes in the form of a clause.

It was unfortunate that such an accident happened.
It's the fog that keeps the dirt and fumes from escaping.

Using the same terms which Hunt assigned to these structures, raters labeled the first sentence as a "deferred subject" sentence and the second as a "cleft" sentence (Hunt, 1965, p. 87). The difference between a sentence with a deferred subject and a cleft sentence is simple, theoretically. One can reposition the deferred subject clause as the grammatical subject, as in "That such an accident happened was unfortunate." This is an acceptable English sentence. But one cannot say "That keeps the dirt and fumes from escaping is the fog." Sentences of this latter kind are cleft sentences.

Subjunctive Word Order

The use of a different word order to express the subjunctive mood ("Had I gone . . ." rather than "If I had gone . . .") was very rare. This structure was found in the writing of only two twelfth graders. One boy used it twice; a girl, once. The subjunctive word order could have been tabulated as an adverb clause without significantly changing the results.

"The More, the Merrier"

Variations of this Anglo-Saxon construction were used by three students, an eighth grader and two twelfth graders. Here are the sentences:

The more money I would have, the more things I could get.
The more daring and dangerous the climb, the more it's enjoyed.
The better the feelings you express, the better your writing will be.

Special Which

This special category, also recognized by Hunt (1964, p. 71), covers which clauses that modify an entire sentence or idea. A more mature writer might use an adverbial clause or would rephrase the sentence, perhaps using which to begin an adjective clause with a definite preceding noun. Some actual sentences were:

I dislike school as a whole because you have to get up so early in the morning which cuts down on your sleep.

His eyes were always moving around the class, which is good eye contact.

I was the smallest in my family which I didn't like.

MEASURES OF SYNTACTIC STRUCTURES

Frequency Counts

For each student's 1000 words of writing, the raters made 15 frequency counts. Of these counts, 11 constituted the total number of each kind of subordinate clause or rare structure: noun, adjective, adverb clauses, and clauses of comparison, deferred subject, cleft sentence, "the more, the merrier" construction, subjunctive word order, clauses complementing an adjective, clauses following a Vs, and the special which clauses. The remaining four frequency counts were those for total number of sentences, T-units, clauses, and words. These last four have little meaning or significance in themselves but are necessary for the computation of five ratios, which Hunt has labeled "synopsis factors."

The Five Synopsis Factors

The five synopsis factors, their relationships, and significance will be summarized here quite briefly. A more detailed discussion can be found in Hunt (n.d.). Three of the five synopsis factors are expressions of average length—length of the sentence, of the T-unit, and of the clause. The other two are the ratios of T-units per sentence and of clauses per T-unit.

Once a very commonly used measure, sentence length is the least valid index of syntactic maturity (Hunt, n.d., p. 17). Although more mature writers do produce longer sentences than younger children, sentence length as a measure of individual growth is relatively unreliable. Immature writers may produce sentences of extraordinary length because they may be unskilled in standard punctuation and more apt to connect a long string of main clauses with coordinators. The longest sentence found in the writing samples of this study consisted of 136 words, 8 times longer than the average eighth grader's sentence. But this sentence contained 11 main clauses connected with coordinators, commas, or simply with no punctuation at all. Sentence length alone as an index of maturity would place this writer far ahead of his classmates who might be more skilled at punctuation and subordination.

By breaking the sentence into its main clauses, or T-units, plus any attached subordinate clauses, one can compute more valid measures of maturity: T-unit length and clause length. T-units may be lengthened in two ways: by adding subordinate clauses and by embedding phrasal structures or single-word modifiers. The amount of embedding a student does is reflected in his clause length, while the addition of subordinate clauses may be measured by the ratio of total clauses divided by total T-units. This clause-per-T-unit ratio, called the subordinate clause index by Hunt (n.d., p. 11), is an arithmetic link between clause length and T-unit length:

$$\frac{\text{words}}{\text{clauses}} \times \frac{\text{clauses}}{\text{T-units}} = \frac{\text{words}}{\text{T-units}}$$

A subordinate clause index of 1.8 indicates that .8 of the time this particular student is including a subordinate clause in the main clause. Because all T-units must contain at least one main clause, this index can never be less than 1.0 and is rarely greater than 2.0. A score of 2.0 would reveal that one subordinate clause is found in every main clause, or T-unit.

Another ratio which can be computed from the counts of sentences, T-units, clauses, and words is that of T-units per sentence (T/s). The total number of T-units is divided by the total number of sentences to give what Hunt (n.d., p. 12) calls the "main clause coordination index." The student who wrote 11 T-units in one sentence would have a T/s ratio of 11.0 for this very small sample of writing. The T/s ratio is never less than 1.0 since each sentence has at least one T-unit or main clause. Average T/s scores were between 1.0 and 2.0. This is the only synopsis factor which decreases with increasing maturity (Hunt, n.d., p. 13). With more mature writers one expects less coordination between main clauses and more subordination and embedding.

As Hunt explained (n.d., p. 14), these five synopsis scores all have a definite mathematical relationship and can be computed in a sequence like this:

Let w = total number of words
cl = " " " clauses
T = " " " T-units
s = " " " sentences

$$\frac{w}{cl} \times \frac{cl}{T} = \frac{w}{T} \times \frac{T}{s} = \frac{w}{s}$$

Suppose a student in his 1000-word sample wrote 125 clauses, 84 T-units, and 68 sentences. One would calculate:

$$\frac{1000}{125} \times \frac{125}{84} = \frac{w}{T} \times \frac{84}{68} = \frac{w}{s}$$

The actual values here would be:

$$8.00 \times 1.49 = 11.9 \times 1.24 = 14.8$$

$$\frac{w}{cl} \qquad \frac{cl}{T} \qquad \frac{w}{T} \qquad \frac{T}{s} \qquad \frac{w}{s}$$

TRAINING OF RATERS

Two raters were trained to analyze the writing samples. They identified and marked T-units and subordinate clauses and assigned a label to each subordinate clause. In a two-week period they were taught to recognize the various kinds of clauses and to indicate the names of clauses with a standard notation, N for noun clause, comp for clauses of comparison, and so on. When further training seemed unnecessary, each rater was asked to analyze identical samples of eighth-grade writing independently. The samples contained 50 typed papers, each approximately 1000 words long, making a total of 50,000 words for each rater. Pearson product-moment correlation coefficients between the two raters' analyses were calculated as a measure of interrater reliability. The correlations for the measures were 1.00 for sentences, .99 for T-units, .91 for total subordinate clauses, and .79 for words. Correlations between the two raters for classification of kinds of subordinate clauses were .86 for adjective clauses, .94 for adverb and noun clauses, and .85 for clauses of comparison.

To assure accuracy of the final counts and classifications for the writing samples used in the statistical analyses, a third person compared the notations on all papers after each rater had made independent analyses. Discrepancies in the two raters' tallies of words, clauses, T-units, and sentences were traced to the specific sentences, and errors were corrected. Disagreements in the classifications of types of subordinate clauses also were resolved by the third person.

IV
RESULTS

To find possible differences in the syntactic structures used by eighth and twelfth graders, the investigators tested five synopsis scores and eleven frequency counts of subordinate structures. An analysis of variance was employed with eight students in each cell (total N = 64). The factors of the 2 x 2 x 2 design were grade, sex, and ability level.

SYNOPSIS FACTORS

The total number of sentences, T-units, clauses, and words was tabulated for each student. From these tabulations, five ratios, or synopsis factors, used by Hunt (n.d.) were calculated. The synopsis factors were the ratios of words per clause, clauses per T-unit, words per T-unit, T-units per sentence, and words per sentence.

Clause Length: Words per Clause

After the total number of sentences, T-units clauses, and words was tabulated, the numbe of words was divided by the number of clauses (main and subordinate) to get an average claus length for each student. For the eighth grade, the average clause length was 7.8 words; for the twelfth grade, the average clause length was 9.0 words. This difference was significant for grade at the .01 level (Table 2). Fig. 1 shows the mean clause length for each stude

Differences for the main factors of ability and sex did not reach significance, but two second-order interactions were significant. They were grade x sex ($p < .01$) and grade x ability ($p < .05$). An examination of the means for each cell (Table 3) showed that the twelfth-grade males wrote longer clauses than the females (9.4 words to 8.6), while in the eighth

Table 2

Analyses of Variance of Five Synopsis Factors

Source	df	Clause Length SS	Clause Length F	Subordinate Clause Index SS	Subordinate Clause Index F	T-unit Length SS	T-unit Length F	Main Clause Coordination Index SS	Main Clause Coordination Index F	Sentence Length SS	Sentence Length F
Grade	1	22.99	25.84**	.12	3.38	111.83	22.54**	.50	25.23**	7.49	.68
Ability	1	.74	.83	.00	.00	2.33	.47	.03	1.73	2.60	.24
Sex	1	.38	.43	.01	.20	.01	.00	.01	.30	.54	.05
G x A	1	3.84	4.32*	.07	1.94	31.36	6.32*	.00	.00	53.11	4.84*
G x S	1	7.10	7.98**	.01	.28	11.22	2.26	.02	.89	6.70	.61
S x A	1	.16	.17	.00	.00	1.44	.29	.04	2.23	14.34	1.31
G x A x S	1	.14	.15	.00	.00	.60	.12	.01	.56	3.66	.33
Within Cells	56	49.83	--	2.03	--	277.83	--	1.11	--	615.06	--

*p < .05
**p < .01

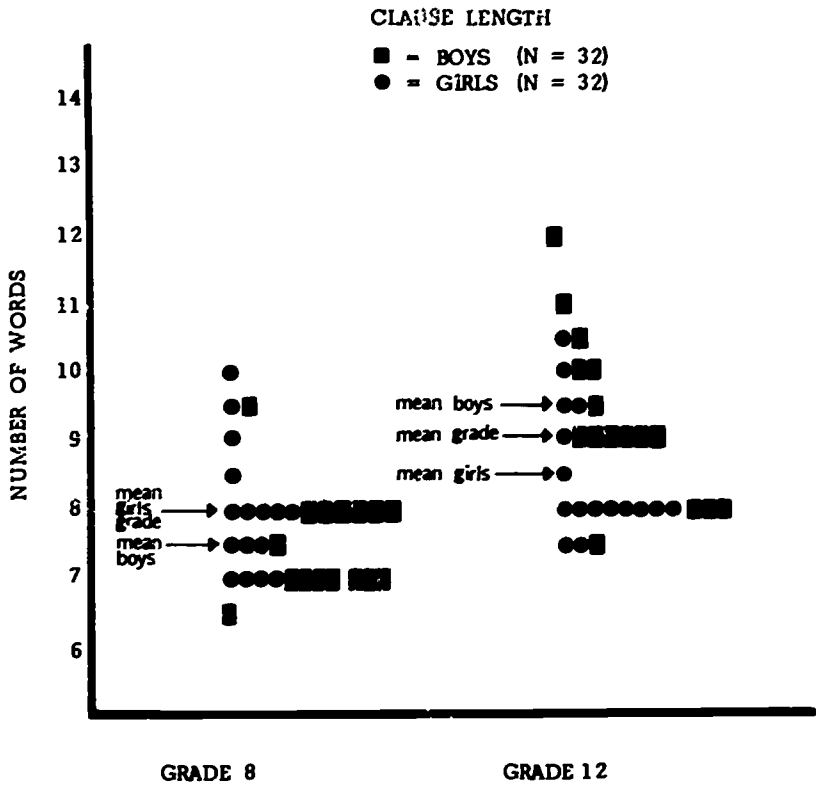

Fig. 1. Mean Clause Length for Each Student (Significant Difference for Grade, $p < .01$)

grade the females wrote longer clauses than the males (8.0 words to 7.5). The means for each grade x sex group were not affected by any one individual having an extremely high or low score. Of the 16 twelfth-grade males, 5 had an average clause length of 10 words or more; only 2 females scored 10 words or more. In Grade 8, three males wrote clauses averaging less than 7 words; no female did this. As seen in the grade x ability interaction, the average ability students in Grade 8 wrote longer clauses than the high ability group (7.9 words to 7.6). The situation was reversed in Grade 12 where the high ability students scored 9.4 words per clause, and the average ability, 8.7. Although twelfth graders in general wrote significantly longer clauses than eighth graders, the average ability females in both grades produced clauses with a mean length of 8.3.

Subordinate Clause Index: Clauses per T-unit

No significant differences were found for the average number of clauses included in each T-unit (Table 2). Eighth graders wrote nearly as many subordinate clauses as twelfth graders. The mean for Grade 8 was 157 clauses per 100 T-units; for Grade 12, 166. The average ability groups in both grades scored approximately the same on this measure: 161 for Grade 8, 163 for Grade 12. High ability eighth graders scored 153; high ability twelfth graders scored 169 (Table 4).

T-unit Length: Words per T-unit

One main factor and one interaction were significant for the measure of T-unit length (Table 2). Twelfth graders wrote longer T-units than eighth graders ($p < .01$). The average T-unit produced by a twelfth grader was 15.0 words long. An eighth grader's average T-unit was 12.3 words long. Fig. 2 shows the mean T-unit length for each student. The significant grade x ability interaction ($p < .05$) reflects the fact that average ability eighth graders wrote longer T-units than their higher ability classmates (12.8 words to 11.8), while in the twelfth grade, students in the high ability group wrote longer T-units than those in the average group (15.9 words to 14.1). The mean T-unit length (Table 3) for the average eighth-grade group was raised a great deal by three students, a female who averaged 18 words per

Table 3

Cell Means for Five Synopsis Factors

Factors	Grade 8				Grade 12			
	Males		Females		Males		Females	
	High	Aver.	High	Aver.	High	Aver.	High	Aver.
Clause length	7.50	7.60	7.80	8.30	9.80	9.10	9.00	8.30
Subordinate Clause Index	1.55	1.60	1.52	1.62	1.67	1.61	1.71	1.66
T-unit length	11.60	12.20	12.00	13.50	16.30	14.50	15.40	13.70
Main clause coord. index	1.34	1.32	1.21	1.35	1.12	1.12	1.10	1.16
Sentence length	15.50	16.30	14.50	18.20	18.20	16.30	16.90	15.90

Table 4

Number of Subordinate Clauses
and Sentences per 100 T-units

	Grade 8				Grade 12			
	Males		Females		Males		Females	
	High	Aver.	High	Aver.	High	Aver.	High	Aver.
Subordinate clauses	155	160	152	162	167	161	171	166
Number of Sentences	74	75	82	74	89	89	90	86

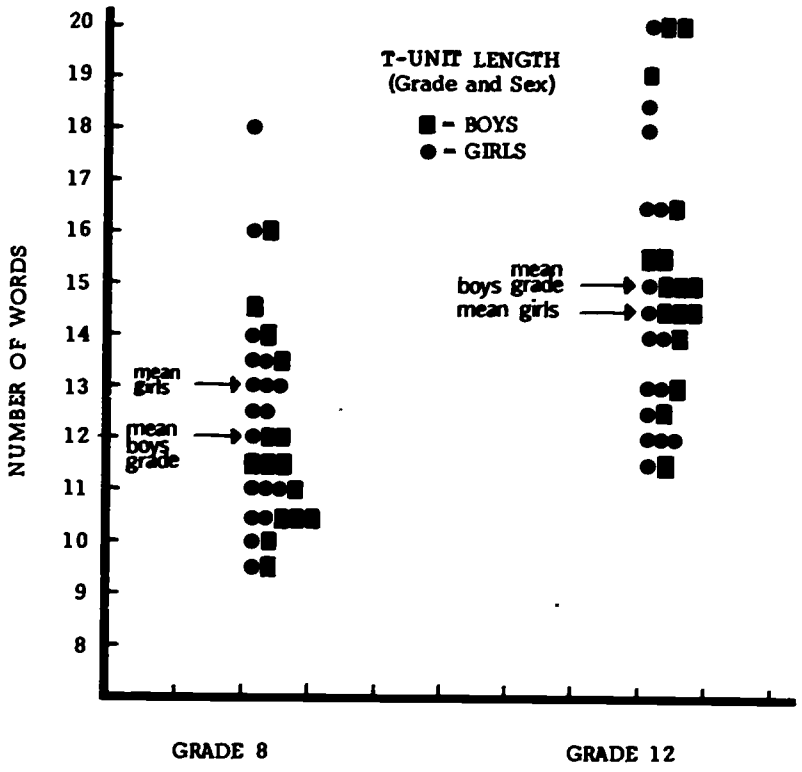

Fig. 2. Mean T-unit Length for Each Student (Significant Difference for Grade, $p < .01$)

T-unit, and a male and female who averaged 16 words per T-unit, all well above the grade mean of 12.3 (Fig. 2).

A study of the number of T-units of varying lengths written by each group (Fig. 3) showed that eighth graders produced more short T-units (one to eight words in length) than did twelfth graders. From a total of 2650 T-units written by the eighth graders, 30.3% fell in the short category, while 19.1% of the 2200 T-units produced by twelfth graders were short. The middle range of the continuum (T-units of 9 to 20 words) constituted the bulk of the writing and occurred with nearly equal frequency in the writing of both grades. In this middle range the high ability twelfth graders produced fewer T-units than any other group. In the upper range of T-units (above 20 words), this same group produced the greatest number. Twelfth graders in general wrote more T-units longer than 20 words than did eighth graders.

From a profile of the number of T-units of each length written by students in both grades (Fig. 4), one can see that eighth graders wrote a larger number of short T-units than twelfth graders but also that eighth graders produced the three longest T-units in the corpus of writing.

Main Clause Coordination Index: T-units per Sentence

The sentences of eighth graders contained more T-units ($p < .01$) than those of twelfth graders (Table 2). The mean for Grade 8 was 1.30 T-units per sentence; for Grade 12, 1.13. This indicates that eighth graders included a second main clause in 30% of their sentences, while twelfth graders did this only 13% of the time. On an average, eighth graders wrote 100 T-units in 77 sentences; twelfth graders wrote 100 T-units in 88 sentences (Table 4).

The frequency of ways in which main clauses were coordinated within a sentence and the average number of times each coordinator was used per student were tallied (Table 5). Eighth graders coordinated main clauses a total of 574 times; twelfth graders used about one-half as much main clause coordination. The two most commonly used coordinators for both grades were and and but. In 1000 words the eighth-grade student used and 6.6 times as a main clause coordinator. The twelfth grader averaged 3.4 times. The means for but were 3.6 and 2.0 for eighth and twelfth grade, respectively. The third most frequent method for incorporating T-units within a sentence was to employ no punctuation at all. Each eighth grader did this approximately 3.1 times, while each twelfth grader averaged less than one.

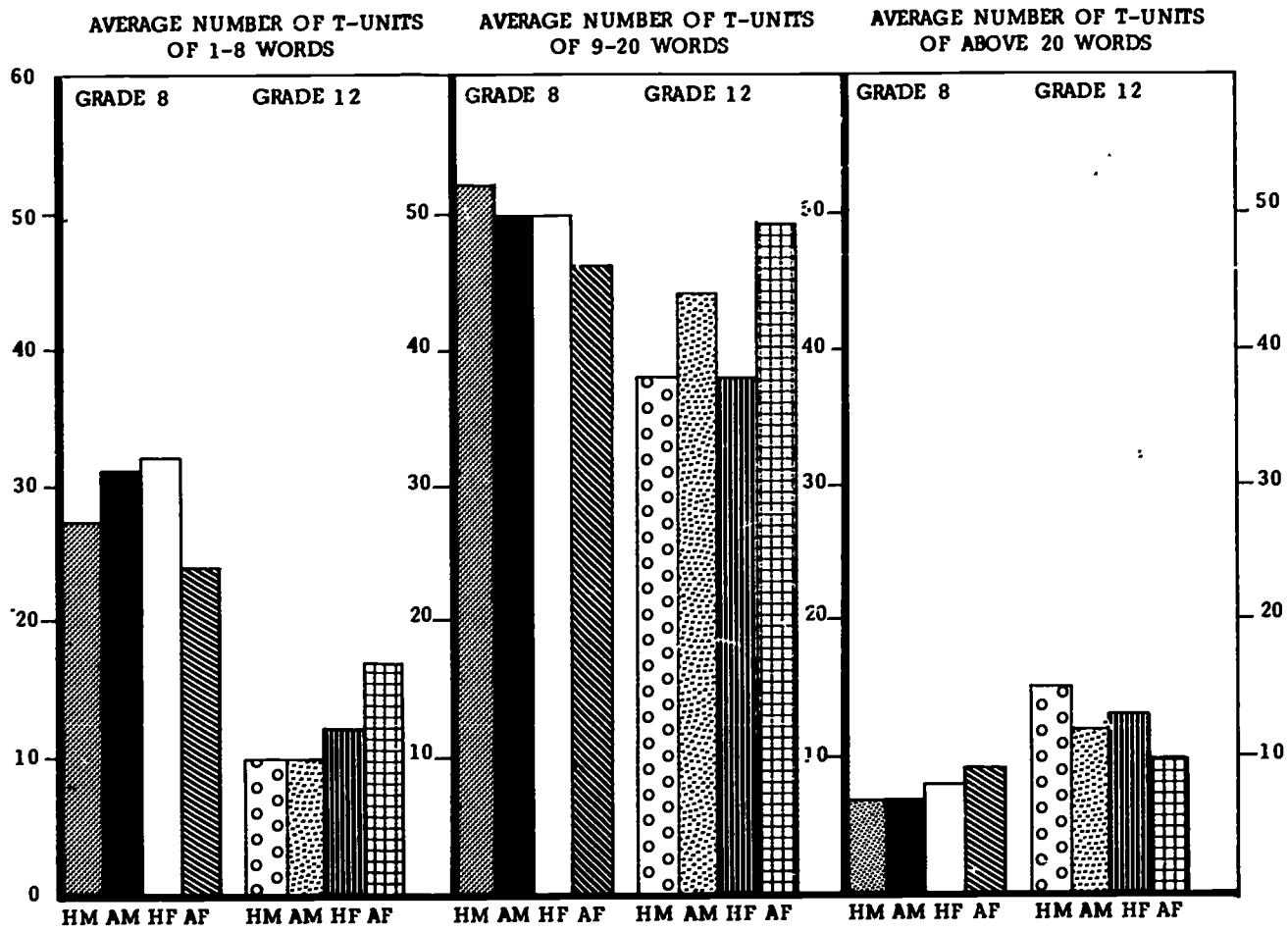

Fig. 3. Number of T-units of Varying Lengths Written by Each Group

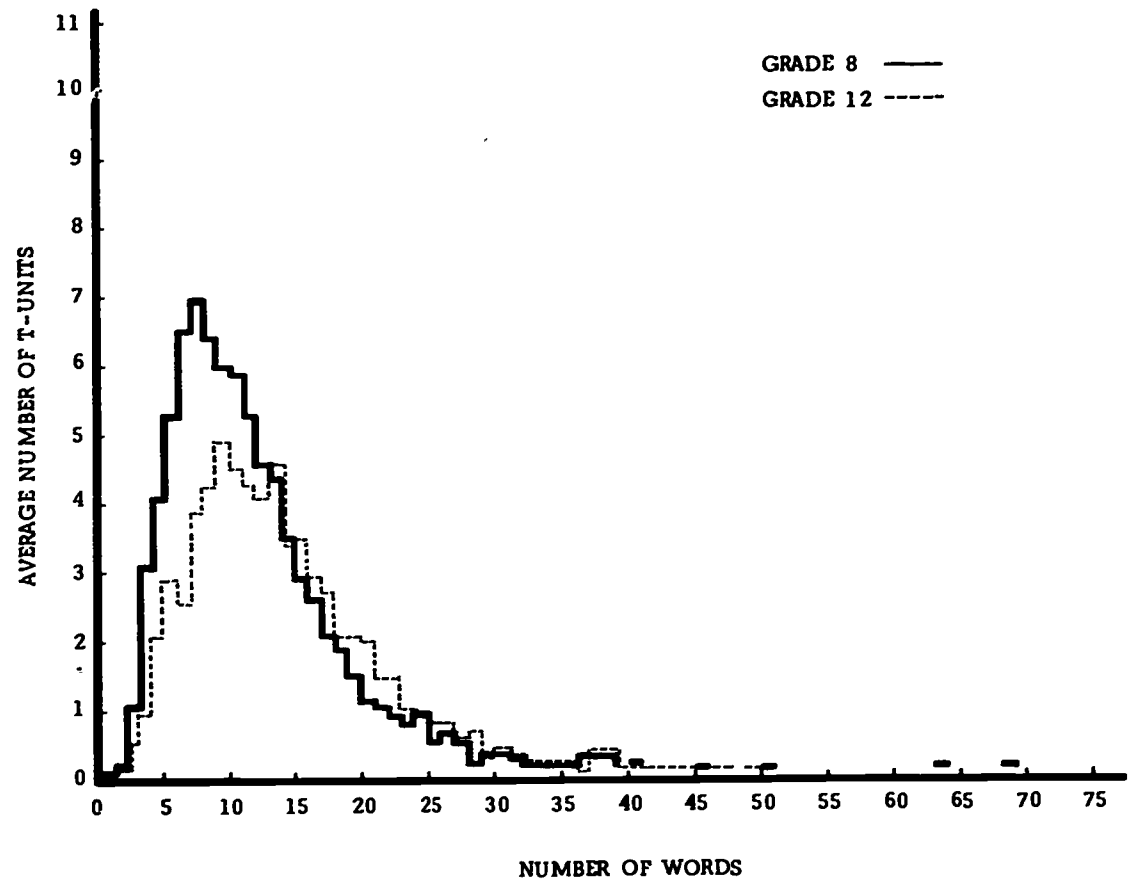

Fig. 4. T-units of Each Length for Two Grades

Sentence Length: Words per Sentence

No main factor was significant for sentence length (Table 3). Eighth graders wrote an average of 16.1 words per sentence; twelfth graders wrote 16.8. Males produced slightly longer sentences than females (16.5 words to 16.3). The difference in the average sentence length for the two ability groups was also minimal: 16.2 for the high group, 16.6 for the average (Table 3).

Table 5

Kinds of Main Clause Coordinators for Each Grade

Coordinator	Grade 8		Grade 12	
	Frequency	Average per Student	Frequency	Average per Student
and	212	6.6	109	3.4
but	114	3.6	65	2.0
no punctuation	100	3.1	19	.6
comma only	84	2.6	16	.5
(and) so	53	1.7	18	.6
or	7	.2	8	.3
for	4	.1	1	.03
nor	--	--	1	.03
semi-colon	--	--	7	.2
colon	--	--	1	.03
Total	574		245	

There was a significant difference in the interaction of grade x ability ($p < .05$). Students of average ability in the eighth grade wrote longer sentences than those of high ability (17.2 words to 15.0). In the twelfth grade, the mean sentence length for the high ability group was 17.5, while the average group scored 16.1. Fig. 5 shows the distribution of scores for each ability level. Among the five students writing the longest sentences in Grade 8, four were of average ability. In Grade 12, four of the five highest scores were obtained by students of high ability.

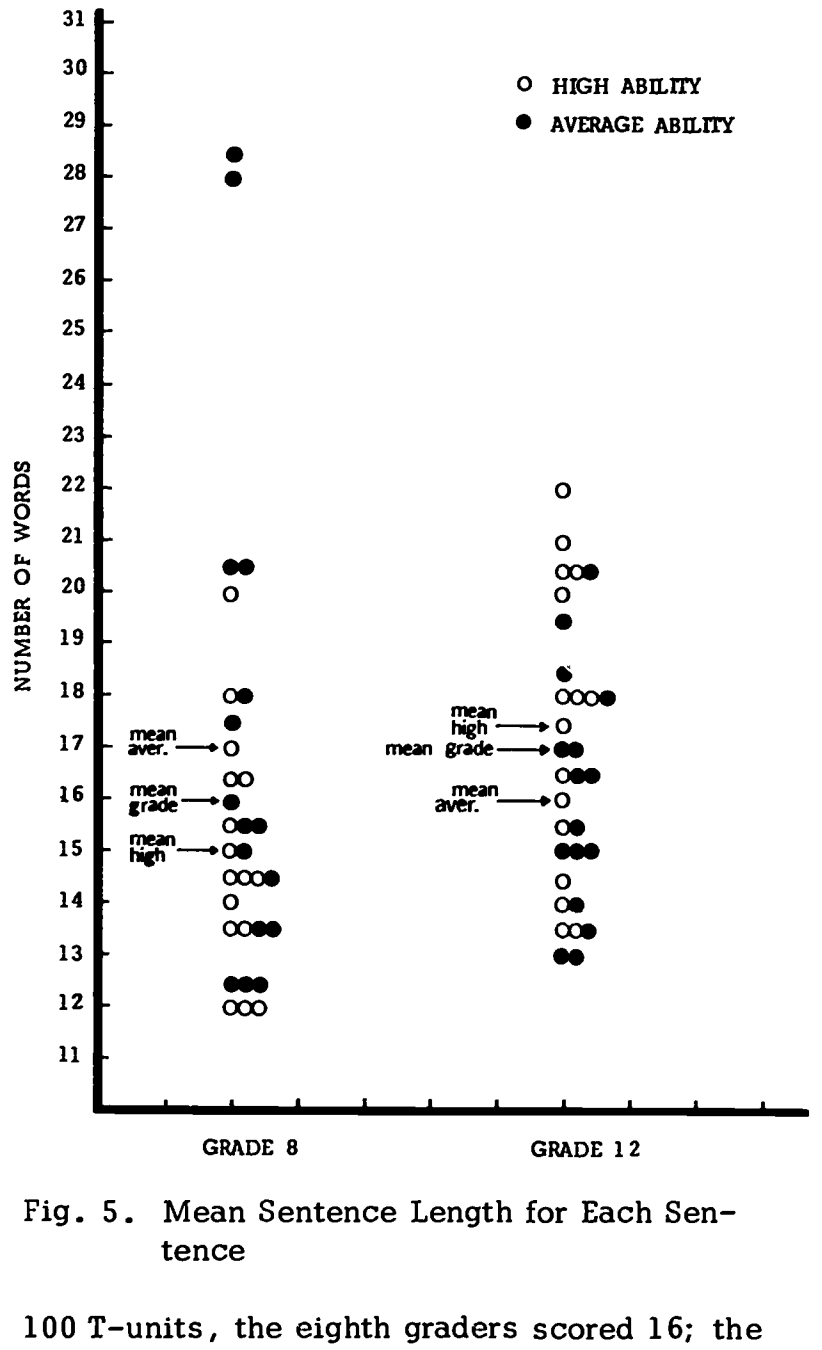

Fig. 5. Mean Sentence Length for Each Sentence

SUBORDINATE CLAUSES

A count was made of the kinds of subordinate structures used by each student in 1000 words of writing. In addition to the three main kinds of clauses—noun, adjective, and adverb,—students infrequently used eight other subordinate structures: clauses of comparison, clauses complementing an adjective, clauses following a Vs, deferred subjects, cleft sentences, subjunctive word order, special which clauses, and "the more, the merrier" constructions. Table 6 shows the frequency of each of these 11 subordinate structures for Grades 8 and 12.

Noun Clauses

Eighth graders used fewer noun clauses ($p < .01$) than twelfth graders (Table 7). The eighth-grade student employed 13.2 noun clauses, the twelfth-grade student employed 17.8. In terms of number of noun clauses per 100 T-units, the eighth graders scored 16; the twelfth graders, 26. From Table 8 one can see

Table 6

Frequency of Eleven Subordinate Structures

Structure	Grade 8	Grade 12
Noun clause	422	570
Adjective clause	316	34[r]
Adverb clause	600	436
Clause of comparison	28	31
Clause complementing an adjective	5	4
Clause following a Vs	8	2
Deferred subject	1	10
Cleft sentence	4	8
The more, the merrier	1	2
Special which	10	4
Subjunctive word order	0	3

that the majority of noun clauses were begun with the word that or the deleted that. Few of these clauses occurred in the subject position; most were the result of indirect discourse or paraphrasing.

Adjective Clauses

Although twelfth graders wrote slightly more adjective clauses than eighth graders (10.8 and 9.9, respectively), no factor reached significance for this measure (Table 7). The number of adjective clauses per 100 T-units for eighth grade was 12; for twelfth grade, 16. A

Table 8

Noun Clause Introducers

Introducer	Grade 8	Grade 12
Ø	174	131
that	115	233
what	59	103
how	20	37
if	15	13
when	13	4
where	9	15
why	6	14
who	3	5
whether	2	5
because	2	1
just because	1	0
so Ø	1	0
which	1	2
if and when	1	0
what and how	0	1
how and why	0	1
whoever	0	1
whatever	0	2
whom	0	1
:	0	1
Total	422	570
No. of different structures used	15	18

summary of the means for each grade x ability x sex group might be of some interest since the score for one group in each grade varied markedly from the other three (Table 9). An

Table 7

Analyses of Variance of Four Kinds of Subordinate Clauses

Source	df	Noun		Adjective		Adverb		Comparison	
		SS	F	SS	F	SS	F	SS	F
Grade	1	333.06	10.98**	13.14	.59	784.00	21.71**	.14	.13
Ability	1	60.06	1.98	43.89	1.98	45.56	1.26	.39	.37
Sex	1	36.00	1.19	.39	.02	.00	.00	.39	.37
G x A	1	.56	.02	.02	.00	1.00	.03	.02	.01
G x S	1	121.00	3.99	58.14	2.63	217.56	6.02*	.39	.37
S x A	1	121.00	3.99	74.39	3.36	2.25	.06	.77	.73
G x A x S	1	4.00	.13	8.27	.37	10.56	.29	1.89	1.81
Within Cells	56	1698.25	--	1239.88	--	2022.50	--	58.62	--

*p < .05
**p < .01

Table 9

Average Number of Three Kinds of Subordinate Clauses for Each Cell

Clauses	Grade 8				Grade 12			
	Male		Female		Male		Female	
	High	Aver.	High	Aver.	High	Aver.	High	Aver.
Noun	11.1	16.5	13.1	12.0	13.6	17.6	20.1	17.6
Adjective	11.3	6.8	10.1	11.4	13.4	10.3	9.9	9.6
Adverb	21.3	23.6	18.0	19.5	11.6	11.9	14.1	16.8

average ability male in Grade 8 incorporated approximately 6.8 adjective clauses in his 1000 words. This was 3 points below the grade mean of 9.9. All other eighth graders wrote about 10 to 11 adjective clauses. In Grade 12 a high ability male averaged about 3 points above the grade mean of 10.8 with a score of 13.4.

Table 10 presents a summary of the kinds of structures used to introduce adjective clauses. The most common introducer for both grades was the deleted that. This occurred 138 times in eighth-grade writing and 86 times in twelfth-grade writing. The second most frequently used introducer for Grade 8 was that, but for Grade 12 the use of which exceeded that. Twelfth graders wrote more than twice as many clauses beginning with which as eighth graders. Also, whom did not occur in the entire corpus of writing although of whom was used by one twelfth grader. A variety of prepositions preceded the relative which. Instances of a preposition immediately preceding the relative happened more frequently in the writing of twelfth graders than in eighth-grade writing.

Table 10

Adjective Clause Introducers

Introducer	Grade 8	Grade 12
∅	138	86
that	79	63
which	36	80
who	25	67
where	15	12
in which	8	8
when	4	7
why	4	3
whose	1	2
after (which)	2	1
at which	2	0
from which	2	3
by which	0	2
of which	0	2
on which	0	3
through which	0	1
to which	0	1
whereby	0	1
of whom	0	1
Total	316	345
No. of different structures used	12	18

Adverb Clauses

More adverb clauses were produced by eighth graders ($p < .01$) than by twelfth graders (Table 7). The eighth-grade mean for 1000 words was 20.6; the twelfth-grade mean was 13.6. The number of adverb clauses per 100 T-units was 25 for Grade 8 and 20 for Grade 12. A survey of the kinds of words used to introduce adverb clauses (Table 11) shows that the predominance of adverb clauses in eighth-grade writing is probably the result of an extensive use of when. About one-third of all adverb clauses written by eighth graders were when clauses. Because and if were the next most frequently used introducers.

The interaction of grade x sex was also significant ($p < .05$). From Table 9 one can see that the eighth-grade males wrote more adverb clauses than the females, but in Grade 12 the females scored higher than the males. Another observation is that eighth-grade males constructed twice as many adverb clauses as the males in Grade 12, while the females from each grade wrote about the same number. No eighth-grade male wrote less than 15 adverb clauses; the highest count was 37.

Clauses of Comparison

No factor reached significance for this measure. The total number of clauses of comparison for Grade 8 was 28; for Grade 12, 31. Table 12

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Table 11

Adverb Clause Introducers

Introducer	Grade 8	Grade 12
when	213	77
because	120	88
if	111	79
as	42	29
before	22	11
after	31	11
so Ø	24	6
so that	10	8
until	14	12
while	10	22
since	8	27
till	7	0
although	6	12
whenever	4	0
as far as	5	1
as long as	1	1
whether	1	4
like	4	3
for	4	5
even though	3	4
unless	3	4
even if	3	1
as if	3	0
just as	2	5
now that	2	0
where	1	5
no matter how	1	3
ever since	1	1
once	1	0
in case	1	0
let alone	1	0
wherever	1	0
whereas	0	6
in that	0	3
whatever	0	2
except Ø	0	2
though	0	1
in order for	0	1
in order that	0	1
except that	0	1
Total	660	436
No. of different structures used	32	32

lists the 18 different kinds of introducers found for this type of clause. No one single introducer was used predominantly in either grade.

Clauses Complementing an Adjective

Ability was a significant factor ($p < .01$) in clauses complementing an adjective. Only high ability students produced instances of this kind of clause, five in Grade 8 and four in Grade 12. The frequency of structures used in each grade is shown in Table 13. The only structure occurring in the writing of both grades was sure Ø, as in "I'm sure he's going."

Table 12

Introducers to Clauses of Comparison

Introducer	Grade 8	Grade 12
as $\begin{matrix}\text{adv}\\\text{adj}\end{matrix}$ as	6	7
-er than	4	3
so adj that	6	3
so adj Ø	2	0
so adv that	1	1
so adv Ø	3	0
adj enough that	1	0
so much that	1	0
so many N Ø	2	0
more N than	1	1
as much N as	1	0
same N as	0	5
such N that	0	3
different N than	0	1
more adj than	0	1
such that	0	3
different than	0	2
same as	0	1
Total	28	31
No. of different structures used	11	12

Clauses Following a Verb Like *Seem* (Vs)

Clauses following a Vs (seem, feel, sound) occurred eight times in the eighth-grade writing, three times in the twelfth-grade writing (Table 13). Three of the eighth-grade instances were produced by a single high ability male; the other five came from three average ability females. In Grade 12 two structures of this type were produced by a high ability female, and one by an average male. The interaction of grade x ability x sex was significant ($p < .05$).

Deferred Subject and Cleft Sentences

Sentences such as "It was good that she left." occurred twice in eighth grade and ten times in twelfth grade. One high ability female produced the two instances in Grade 8; those in Grade 12 were distributed among both sex and ability groups.

Table 13

Frequencies of Rare Structures

	Grade 8	Grade 12
Structure of Clauses Complementing Adjectives		
jealous that	1	0
sure that	0	1
sure Ø	2	1
glad Ø	1	0
sure how	1	0
determined that	0	1
convinced that	0	1
Total	5	4
Structure of Clauses Following a Vs		
feel like	3	0
look like	4	0
seem like	1	1
sound like	0	1
sound as if	0	1
Total	8	3
Deferred subject	2	10
Cleft sentence	5	8
Special which	10	4
The more, the merrier	1	2
Subjunctive word order	0	3

Instances of the cleft sentence ("It's the poor who suffer.") occurred five times in Grade 8 and eight times in Grade 12.

"The More, the Merrier," and the Subjunctive Word Order

Three students wrote a sentence of "the more, the merrier" construction; a high ability eighth-grade male, and two average ability twelfth graders—a male and a female. The three instances of the subjunctive word order were produced by two twelfth graders, two by an average ability male, and one by a high ability female.

Special *Which* Clause

Fourteen instances were found of a which clause modifying an entire sentence or having no specific antecedent. Ten of these were in eighth grade, two were in twelfth. The interactions reaching significance were grade x sex and sex x ability. The interaction of grade x sex may be attributed to the relatively high mean for the eighth-grade female group of .5 compared to 0 for the twelfth-grade females. Males in Grade 8 scored slightly lower than males in Grade 12. The sex x ability interaction may be accounted for by the fact that the high males and average females had nearly equal means, .3 and .4, respectively. The mean of .8 in the average ability eighth-grade female group is attributed largely to one girl who produced three special which clauses.

COMPARISONS WITH OTHER STUDIES

Since other investigators have made similar studies of syntactic structures in writing, some comparisons of their results and the results of this study might be useful. The studies most directly relevant are those conducted by Kellogg Hunt at the Florida State University. Hunt (1965 and n.d.) first defined the measures of syntactic growth used in the present study; he also used eighth graders (N = 18) and twelfth graders (N = 36). Hunt's average ability groups scored between 90 and 110 on the California Test of Mental Maturity (CTMM); the average ability students in this study scored 90 to 110 on the Kuhlmann-Anderson Test (KAT). In investigating the possible differences in the writing of average and superior twelfth graders, Hunt chose students for the superior group whose CTMM score was 130 or above. In this study the high ability students in twelfth grade scored 117 or above on the KAT.

O'Donnell, Griffin, and Norris (1967) studied syntactic control in the speech and writing of children in kindergarten through seventh grade. The measures used by O'Donnell et al. which are comparable to those of the present study are T-unit length; and the frequencies of noun, adverb, and relative clauses per 100 T-units. Only the results of the seventh-grade writing analysis will be mentioned for comparison.

Mellon (1967) reported the results of an experiment with seventh graders in which samples of writing were collected before and after treatment. T-unit length was one of the measures of possible syntactic change. The results of the present study and Mellon's study, however, do not seem comparable since Mellon redefined T-unit, categorizing adverbial clauses of condition, concession, reason, and purpose (introduced by if, because, although, so that, and so on) as separate T-units. These kinds of clauses comprised about 44% of the adverbial clauses found in the eighth-grade writing of the present study. A comparison of the results of the two studies would probably have little

meaning since differences would be attributable to the definition of T-unit rather than to other factors.

Synopsis Factors

Generally, results of the present study complemented the findings of Hunt on the five synopsis factors (Table 14). The two major differences were that Hunt's statistics on the subordinate clause index and on sentence length reached significance for grade while no significance was found in the present study. Also, this study showed no difference in the writing of boys and girls; Hunt reported differences for sex on two measures, clause length and sentence length. The present study discovered no consistent significant difference in the writing of high and average ability students at the two grade levels; Hunt found that the measure of T-unit length alone consistently separated the superior students from the average in Grades 4 and 12, as well as distinguishing reliably between grade levels.

Clause Length. In general this study supports Hunt's conclusions about clause length as a measure of maturity. Hunt (1965) reported a significant increase in the length of clauses for Grades 4, 8, and 12 ($p \leq .01$). In the present study the difference of 1.2 words ($p < .01$) in the length of clauses produced by eighth and twelfth graders complements Hunt's statement that the average length of clauses increased with maturity. However, in this study as well as in Hunt's, there was a great deal of overlapping between eighth and twelfth graders. Twenty out of 32 (62.5%) eighth graders had an average clause length exceeding the lowest score in Grade 12. In Hunt's study, 15 out of 18 (83%) eighth graders overlapped the twelfth graders.

At all three grade levels the boys in Hunt's study wrote longer clauses than the girls ($p < .01$). In the present study the factor of sex did not reach significance. In Grade 8 the girls wrote longer clauses than the boys, while in Grade 12 the boys exceeded the girls in clause length. This grade x sex interaction was significant ($p < .01$).

Hunt (1965) indicated that, although the overall increase in clause length between Grades 4 and 12 was significant, growth between Grades 8 and 12 was slight. In his 1965 study using average ability students, eighth graders

Table 14

Summary of the Findings of Two Studies on the Five Synopsis Factors

Factors	Grade 8		Grade 12	
	Blount Study	Hunt Study	Blount Study	Hunt Study
Clause length				
Average ability	8.0	8.1	8.7	8.6
High ability	7.7	---	9.4	10.4
Subordinate clause index				
Average ability	1.61	1.42	1.63	1.68
High ability	1.54	---	1.69	1.54
T-unit length				
Average ability	12.8	11.5	14.1	14.4
High ability	11.8	---	15.9	16.2
Main clause coordination index				
Average ability	1.33	1.37	1.14	1.17
High ability	1.27	---	1.11	1.15
Sentence length				
Average ability	17.2	15.9	16.1	16.9
High ability	15.0	---	17.5	18.6

had a mean of 8.1 words per clause while twelfth graders wrote clauses averaging 8.6 words. In the present study the increase in clause length between the average ability students in the two grades was considerably more than the increase which Hunt found. Average students increased their clause length by nearly one word per clause, from 7.9 words in Grade 8 to 8.7 in Grade 12. Also, the mean clause length for high ability students increased even more dramatically from 7.6 words in Grade 8 to 9.4 in Grade 12. Although in this study the means for each group increased markedly, the data support Hunt's suggestion (n.d.) that clause length seems to be a more reliable index of maturity at the upper range between superior and average twelfth graders and skilled adults than at the lower level of fourth grade. The fact that average ability eighth graders in the present study actually wrote longer clauses than their higher ability classmates ($p < .05$) suggests that clause length, as a measure of individual growth, is imprecise—at least at the eighth-grade level. However, by the time students reach twelfth grade, those of higher ability are clearly ahead of the average ability in clause length.

Subordinate Clause Index. Results from both the Hunt study and the present study indicate that the number of subordinate clauses used in 100 T-units increased with maturity. However, only Hunt's findings on this measure were statistically significant ($p < .01$). In both studies the average students produced approximately the same number of subordinate clauses (Table 13). In 100 T-units, students in Hunt's study included 142 subordinate clauses for Grade 8 and 168 for Grade 12 (calculated from Hunt (1965), p. 34). Results of this study showed 157 subordinate clauses for Grade 8 and 166 for Grade 12. The main difference on the measure of subordinate clauses per T-unit between Hunt's study and the present study lies in the amount of subordination found for the two ability levels in twelfth grade. Hunt's average ability students wrote more subordinate clauses in 100 T-units than the high ability students (16.8 to 15.4); in the present study the high ability students produced more subordinate clauses than the average students (16.9 to 16.1).

T-unit Length. This study supports Hunt's conclusion that T-unit length increased significantly with maturity ($p \leq .01$). Working with younger children from kindergarten through seventh grade, O'Donnell et al. also found a consistent increase in T-unit length in both speech and writing. All three studies—Hunt, O'Donnell, and the present—also analyzed the number of T-units of various lengths used in the writing. A comparison was made of the findings of Hunt's study and of the present study on the frequency of T-units of each length for Grade 8 (Fig. 6) and Grade 12 (Fig. 7). Profiles of both studies are nearly identical. In each the longest T-unit was written by an eighth grader. Hunt (1965) found that the number of T-units less than nine words long decreased markedly at each successive grade level. O'Donnell (1967) confirmed this although the decreases in his study were not as sharp as those in Hunt's. In the present study there was also a decline in "short" T-units between Grades 8 and 12 (Fig. 8).

In addition to its effectiveness as an indicator of sentence maturity at different age levels, T-unit length also functioned well in discriminating students of high and average ability in Grades 4 and 12 (Hunt, n.d.); the present study extended this investigation to Grade 8. To compare Hunt's results on differences for ability groups with the results of the present study, a two-tailed t test was applied to the means of the two ability groups in both grades. In Grade 12 the difference between the mean of 14.1 for the average ability students and 15.9 for the high ability students was significant at the .05 level. This confirms Hunt's results for ability groups in twelfth grade. However, at the eighth-grade level, the average ability students wrote longer T-units than the high ability students although the difference between the means for the two ability groups did not reach significance on the t test. This reversal of the consistent increase in T-unit length for higher grade levels and higher ability groups is probably attributable to three individuals in Grade 8 whose average T-unit length was uncommonly high. The two factors affecting T-unit length are the addition of more words of phrasal structures within the clause (clause length) or the addition of more subordinate clauses (subordination ratio). Two of the three students achieved a greater average T-unit length by writing more words per clause, about two words above the grade mean. The third student, whose average clause length was below the grade mean, scored high on T-unit length by incorporating at least two subordinate clauses in each T-unit. This means that this student scored high on a measure which reflects immaturity while the other two students were genuinely precocious in scoring high on a measure indicating maturity.

Hunt (n.d.) concluded that, over a span of eight years from fourth grade to twelfth, T-unit length was the most reliable index of chronological and mental maturity. He also said that a breakdown of the two factors influencing T-unit length revealed that in Grade 4 the most

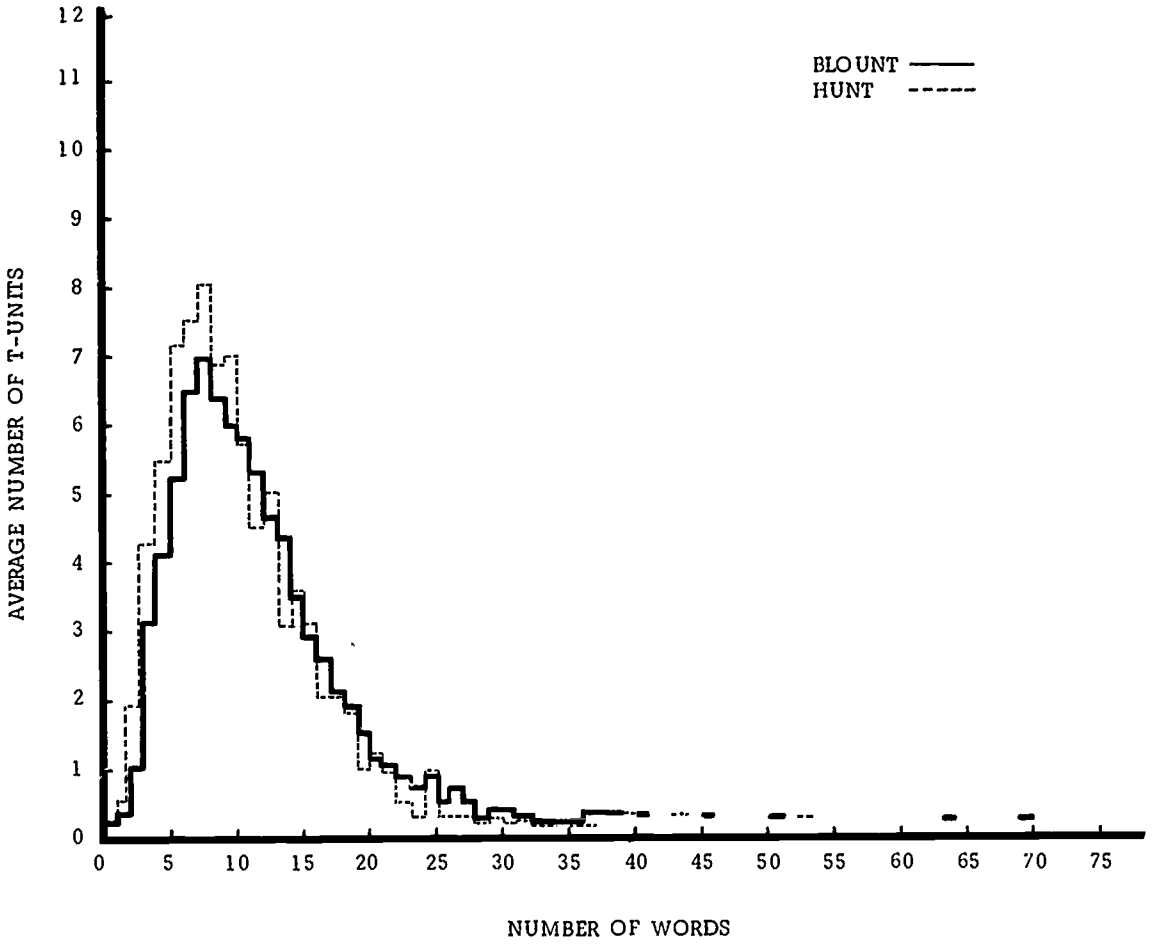

Fig. 6. Comparison of Two Studies of T-unit Length for Grade 8

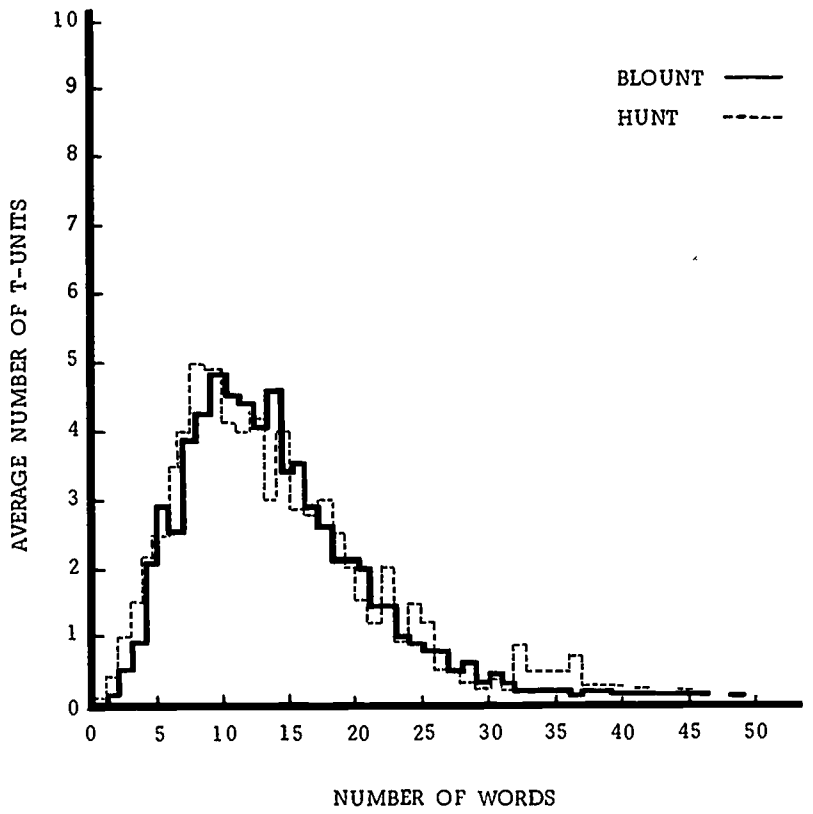

Fig. 7. Comparison of Two Studies of T-unit Length for Grade 12

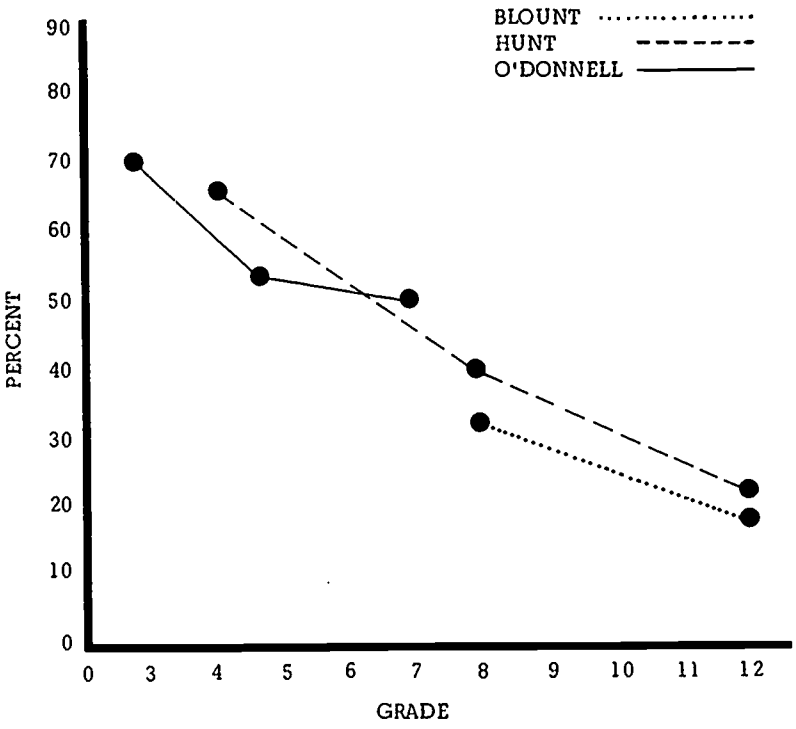

Fig. 8. Percent of T-units Less Than Nine Words Long for Three Studies

dominant force was the subordinate clause index; yet in Grade 12 T-unit length was affected more strongly by clause length than by the number of subordinate clauses. Somewhere between Grades 4 and 12, students began to reduce their number of subordinate clauses while at the same time increasing the amount of words included in a single clause. The present study suggests that this reversal is well-established by the time students reach eighth grade. The non-significance of the number of subordinate clauses included in a T-unit compared to the significance of the length of clauses suggests that at the eighth-grade level clause length is already the more powerful influence of T-unit length. The greater clause length, and

consequently greater T-unit length, achieved by average ability students over high ability might imply that in Grade 8 neither of these measures could reliably distinguish the two ability groups. However, as a general index of chronological maturity at Grade 8, clause length seems most valid.

Main Clause Coordination Index. In the present study as well as in Hunt's studies, the number of T-units found in a single sentence decreased with maturity ($p < .01$). From Table 5 two reasons for this decrease in score seem feasible: 1) older students use and and but less frequently to coordinate main clauses; and 2) older students show more sophistication in the conventions of punctuation. The differences between the scores for each grade were about the same in both studies although the students in the present study wrote consistently fewer T-units per sentence than those in the Hunt study. Eighth graders coordinated main clauses 30% of the time while Hunt's students did so 37% of the time. In the twelfth grade, 13% of the sentences contained coordination between main clauses, compared to 17% for Hunt's twelfth graders.

Sentence Length. Hunt (1965) reported that sentence length increased with maturity and that boys wrote longer sentences than girls ($p < .05$). In the present study the increase in mean sentence length from 16.1 words in Grade 8 to 16.8 words in Grade 12 was not significant. Although the boys wrote slightly longer sentences than the girls (16.5 to 16.3), this difference was not enough to reach statistical significance.

In his study of the syntactic differences between average and superior students, Hunt (n.d.) found that: 1) at the fourth-grade level the average students produced longer sentences than the superior students; and 2) in Grade 12 the situation was reversed with the high ability students writing the longest sentences. Results of the present study showed that in Grade 8 students of average ability wrote longer sentences than those of high ability.

Hunt's reason for average students scoring higher than superior students in Grade 4 was that their lack of punctuation skills and their overuse of and credited them with more words per sentence than their high ability classmates, who had learned standard punctuation more quickly. By Grade 12 when punctuation problems were less prevalent, high ability students exceeded the average ability in sentence length largely because they wrote longer clauses. They did not achieve greater sentence length through coordination of main clauses as did the fourth graders. If the present study is comparable enough to provide information for the time gap between Grades 4 and 12, one could suggest that average students at Grade 8 were still not adept with punctuation and retained the tendency to overuse and and but between main clauses. The high ability twelfth graders of the present study, like those of Hunt's study, produced longer sentences by writing longer clauses, not by coordinating main clauses.

Subordinate Clauses

For a comparison of the frequencies of subordinate clauses found by the three studies—Hunt, O'Donnell, and Blount—most results will be given in terms of the number of clauses per 100 T-units, the method used by O'Donnell. The figures for Hunt's studies were calculated from data reported for eighth grade (1965) and for twelfth grade (n.d.). Data on the noun clause are found on pages 30 and 77 (1965) and on page 63 (n.d.); for the adjective clause, pages 30 and 78 (1965) and page 63 (n.d.); for the adverb clause, pages 30 and 80 (1965) and page 63 (n.d.).

Noun Clauses. O'Donnell (1967) found no significant increase in the number of noun clauses used in the writing of children in Grades K–7. However, Hunt (1965) did find a significant increase with age in Grades 4, 8, and 12 ($p < .05$). The present study also showed an increase of noun clauses from Grade 8 to 12 ($p < .01$). One should remember that at the time of his 1965 study Hunt had not yet excluded direct discourse from the corpus of writing. The use of direct discourse decreases from Grade 4 to 12. Nevertheless, Hunt found that twelfth graders used more total noun clauses than fourth graders because the increase in noun clauses exclusive of direct discourse was greater than the decrease in direct discourse. Although Hunt (1965) reported the frequencies of noun clauses exclusive of direct discourse, he did not test the differences for statistical significance. Results of the present report indicated that the increase for these kinds of noun clauses was significant from Grade 8 to 12 ($p < .01$).

At both grade levels students in the present study produced more noun clauses per 100 T-units than the Florida children. Hunt's twelfth graders used 21 noun clauses compared to 26 for the twelfth graders of the present study. Looking at the scores for the average ability eighth graders, one finds that Hunt's students wrote 13 noun clauses while the students in the present study wrote 17. With these two scores of 13 and 17 for eighth grade, O'Donnell's reported score of 7.47 for seventh grade seems unusual.

In his later study Hunt (n.d.) concluded that the frequency of noun clauses apparently was not related to chronological or mental maturity. Superior students from Grade 4 and Grade 12 used nearly the same number of noun clauses. Average twelfth graders wrote more noun clauses than either their superior classmates or the skilled adults. In the present study there was no difference between the number of noun clauses used by average and high ability students. In Grade 12 the two ability groups wrote 26 noun clauses per 100 T-units; in Grade 8 the high group used 14, slightly lower than the average group's score of 17. These findings, compared to the marked difference between Hunt's average and superior twelfth graders (28 to 14), indicate that perhaps Hunt's suggestion about the reliability of the noun clause as a measure of mental maturity was correct. He suggested (n.d.) that noun clauses vary according to some factor other than maturity, a factor such as topic. Taking the results of each study separately, this would seem a valid conclusion. The discrepancies in the statistics of these two studies could further support this theory.

Adjective Clauses. In Hunt's study of subordinate clauses, the adjective clause alone was the strongest index of chronological maturity from Grades 4 to 12 ($p < .01$). In the present study the adjective clause was the only major subordinate clause which did not reach significance for grade. Eighth graders wrote nearly as many adjective clauses as twelfth graders. The mean for Grade 8 was 9.9; for Grade 12, 10.8. Though there is an increase with age, it is very slight. Comparable means from the Hunt study (1965), computed from data given on page 78, are 8.0 for Grade 8 and 11.6 for Grade 12. From Hunt's data there was an increase in the frequency of adjective clauses of more than 3.5 while the present study shows an increase of less than 1.

In terms of number of adjective clauses per 100 T-units, the figures for Grade 12 are Hunt, 18.6 and Blount, 16; for Grade 8, Hunt, 8.9 and Blount, 12. Again, O'Donnell's figure of 4.46 for Grade 7 is lower than one would predict from the findings of the other two studies.

Although superior students on all levels wrote more adjective clauses, Hunt reported a significant difference only between superior and average fourth graders ($p < .01$ on the Wilcoxon rank-sum test). In the present study also, the high ability students in both grades wrote more adjective clauses than the average ability students (n.s.).

Adverb Clauses. Hunt found an increase, though not significant, in the frequency of adverb clauses from Grade 4 through Grade 12. However, results of the present study showed that adverb clauses decreased with chronological maturity ($p < .01$). The eighth graders included approximately 20.6 adverb clauses in 1000 words of writing. Twelfth graders used considerably less, about 13.6. In terms of number of adverb clauses per 100 T-units, the difference remained but was less dramatic, 25 for Grade 8 and 20 for Grade 12. In contrast, eighth and twelfth graders in Hunt's study employed approximately the same number of adverb clauses per 100 T-units, 15.7 and 18.5 respectively. O'Donnell reported 17.6 adverb clauses for Grade 7, nearly as many as Hunt's twelfth graders.

The difference in the present study between age groups is much more obvious than differences between ability levels. As a means of distinguishing students of average and superior ability in the same grade, the adverb clause was unreliable in both the Hunt study and the present study. At Grade 4 Hunt found superior students using more adverb clauses. At Grade 8 in the present study average students wrote more adverb clauses than high ability students (n.s.). At Grade 12 in the present study there was no difference between the two ability groups; Hunt, however, found average students using more adverb clauses than superior students or skilled adults (n.s.).

V
SUMMARY AND CONCLUSIONS

This study analyzed 1000 words of writing from each of 64 students, 32 in Grade 8 and 32 in Grade 12. For each 1000-word sample a count was made of the frequencies of words, clauses, T-units, sentences, noun clauses, adjective clauses, adverb clauses, and eight other less frequently used subordinate structures. As measures of syntactic maturity, five synopsis factors, first used by Kellogg W. Hunt at the Florida State University, were calculated. These factors were the ratios: words per clause (clause length), clauses per T-unit (subordinate clause index), words per T-unit (T-unit length), T-units per sentence (main clause coordination index), and words per sentence (sentence length). Differences between grade, ability, and sex on each subordinate structure and synopsis factor were tested with a 2 x 2 x 2 analysis of variance.

Results indicated that clause length and T-unit length increased between eighth and twelfth grade ($p < .01$). The increase in T-unit length was accompanied by a decrease in the average number of T-units included within the sentence ($p < .01$). The changes in clause length, T-unit length, and T-unit coordination are each indicative of increased maturity in twelfth-grade writing. The other two synopsis factors, the subordinate clause index and sentence length, failed to reach significance although both increased slightly from Grades 8 to 12. Differences between ability groups or between boys and girls were not great enough to be statistically significant.

An investigation of the use of subordinate clauses revealed that twelfth graders used more noun clauses than eighth graders ($p < .01$). The adverb clause was employed more frequently in the eighth-grade writing than in the twelfth grade ($p < .01$). Although twelfth graders produced more adjective clauses than eighth graders, the difference was not great enough to reach significance. The other clausal structures were infrequent and showed few significant results.

Though some differences in level of significance were noted, the present study supports Hunt's conclusions about the usefulness of the synopsis factors in measuring syntactic maturity. Hunt's data and data from the present study indicated that sentence length is not an informative indicator of writing maturity. What is important is how sentences are lengthened. There is a difference in the structures used by younger and older students to lengthen their sentences. The younger ones, those in eighth grade, achieve greater sentence length by coordinating main clauses, usually with and, but, or no punctuation whatever. Twelfth graders, having become more skilled in punctuation and less generous with coordination, lengthen their sentences by incorporating more words within their T-units and clauses. Since the measure of sentence length responds to T-unit length and also to the amount of coordination between T-units, it is helpful to study these factors separately. T-unit length increases with maturity while T-unit coordination decreases. Thus, T-unit length and T-unit coordination each provide clues to syntactic growth that a measure such as sentence length, affected by both T-unit factors, would not detect.

T-unit length is also affected by two factors. One is the number of subordinate clauses used within the T-unit; the other is the number of words embedded within the main and subordinate clauses. Evidence from this study showed that older students achieved greater T-unit length mainly by writing longer clauses although they also included a few more subordinate clauses. Consequently, the success of T-unit length as a measure of writing maturity rests upon its reflection of increases in clause length.

From this study it is difficult to say whether T-unit length or clause length are of more relevance to the teacher or researcher. Both T-unit length and clause length are reliable

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for indicating growth over a period of years, but results of the present study showed that neither one consistently distinguished students of different ability levels. The apparent overlapping of scores and reversal of trends in Grade 8 implies a great deal of transition and flux at this age.

Consideration of frequency and kinds of subordinate clauses as indications of growth in writing ability appears neither worthwhile nor valid. The present study and Hunt's study (1965) found that older students tend to use more noun clauses. However, analysis of the general means revealed that there is no predictable consistency in growth. For example, Hunt's skilled adults and superior twelfth graders used nearly as many noun clauses as the fourth-grade group. In the present study average eighth graders wrote more noun clauses than average twelfth graders. The use of the adjective and adverb clauses seems equally erratic. Hunt's data indicated that the adjective clause alone increases consistently, and significantly, with age and ability. Data from the present study showed a very slight, nonsignificant increase with age but no obvious trend for ability groups. A discrepancy also exists between the two studies for the use of the adverb clauses. One could assert from data of the present study that younger writers use more adverb clauses than older writers and that students of average ability write more adverb clauses than those of high ability. Hunt found no significant nor consistent trend though older writers employed slightly more adverb clauses than the younger ones.

Discrepancies in available studies and inconsistencies in patterns of growth seem to indicate that a writer's use of subordinate clauses is probably dependent on subject matter, on individual characteristics, or perhaps on geographical differences. However, the synopsis factors, especially clause length and T-unit length, are stable and reliable measures of syntactic maturity.

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